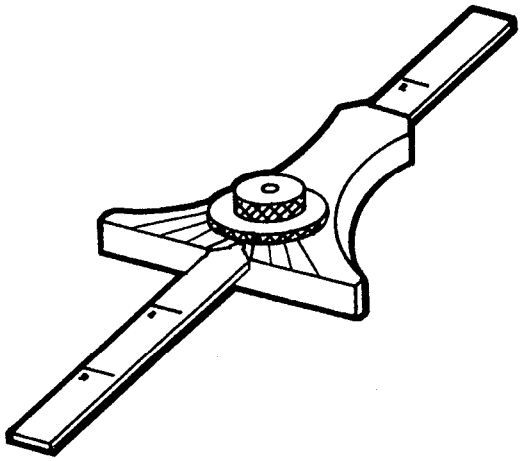
Chapter 14 SURFACE, DEPTH, AND HEIGHT GAGES

HOW TO CHOOSE AND USE THEM

The “Types and Uses” section provides you with a list of the types of gages. These pages should help you select the right gage for the job. The “Using” section tells you how to use the gages for their intended purposes. The ‘Care” procedures tell you how to keep your gages in good condition.



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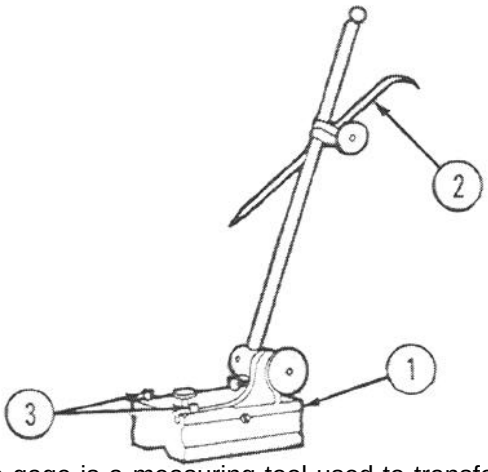
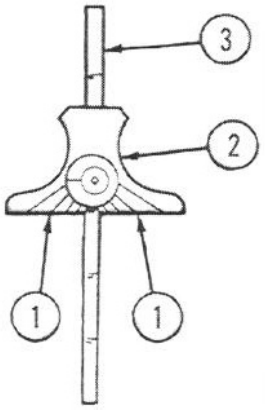
TYPES AND USES

SURFACE GAGE



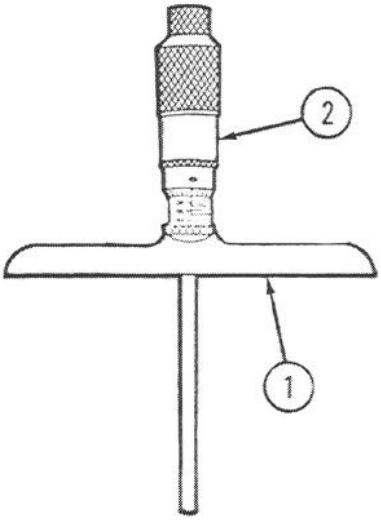
A surface gage is a measuring tool used to transfer measurements to work by scribing a line, and to indicate the accuracy or parallelism of surfaces. The surface gage consists of a base with an adjustable spindle (1) to which may be clamped a scriber or an indicator (2). Surface gages are made in several sizes and are classified by the length of the spindle. The smallest spindle is 4 inches long, the average 9 to 12 inches, and the largest 18 inches. The scriber is fastened to the spindle with a clamp. The bottom and the front end of the base of the surface gage have deep V-grooves. The grooves allow the gage to measure from a cylindrical surface. The base has two gage pins (3). They are used against the edge of a surface plate or slot to prevent movement or slippage.

RULE DEPTH GAGE



A rule depth gage measures the depth of holes, slots, counterbores, and recesses. Some rule depth gages, such as the one shown above, can also be used to measure angles. This is done by using the angle marks (1) located on the sliding head (2). The rule depth gage is a graduated rule (3) with a sliding head (2) designed to bridge a hole or slot. The gage holds the rule at a right angle to the surface when taking measurements. This type has a measuring range of 0 to 5 inches. The sliding head has a clamping screw so that it may be clamped in any position. The sliding head is flat and perpendicular to the axis of the rule. It ranges in size from 2 to 2-5/8 inches wide and from 1/8 to 1/4 inch thick.

MICROMETER DEPTH GAGE



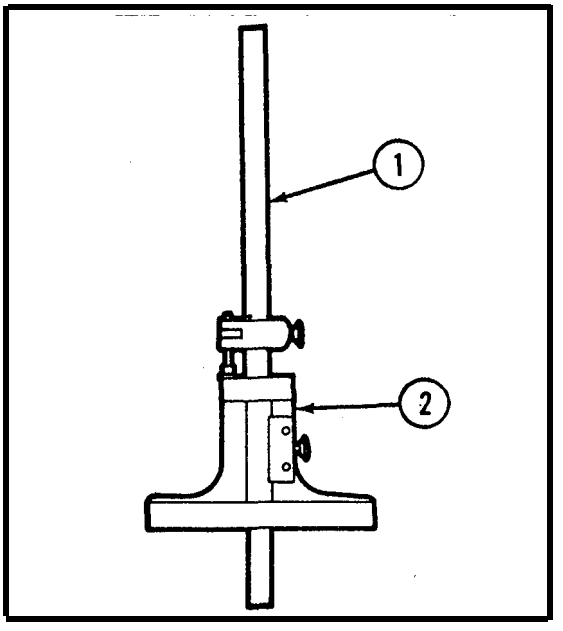
The micrometer depth gage consists of a flat base (1) that is attached to the barrel of a micrometer head (2). These gages have a range from 0 to 9 inches, depending on the length of extension rod used. The hollow micrometer screw has a 1/2 or 1 inch range. Some are provided with a ratchet stop. The flat base ranges in size from 2 to 6 inches. Several extension rods are supplied with this type gage:

NOTE

For additional information on micrometers, see chapter 7 in this manual.

TYPES AND USES - Continued

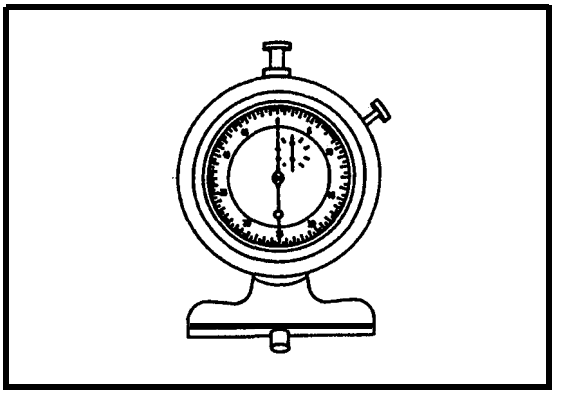
VERNIER DEPTH GAGE



The vernier depth gage consists of a graduated scale (1) either 6 or 12 inches long. It also has a sliding head (2) similar to the one on the vernier caliper. (See chapter 6, Using Vernier Caliper).

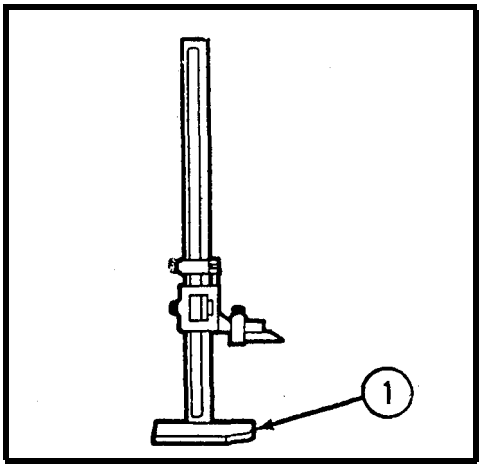
The sliding head is designed to bridge holes and slots. The vernier depth gage has the range of the rule depth gage. It does not have quite the accuracy of a micrometer depth gage. It cannot enter holes less than 1/4 inch in diameter. However, it will enter a 1/32-inch slot. The vernier scale is adjustable and may be adjusted to compensate for wear.

DIAL DEPTH GAGE



Dial depth gages are for rapidly checking depths of holes, recesses, slots, scratches, and paint thicknesses. It should be noted that measurements made with depth gages should be on a longitudinal axis. The depth gage will give direct readings on the dial in half-thousands of an inch (0.0005 in.); press the push button down until the measuring rod contacts the work and read the depth on the dial.

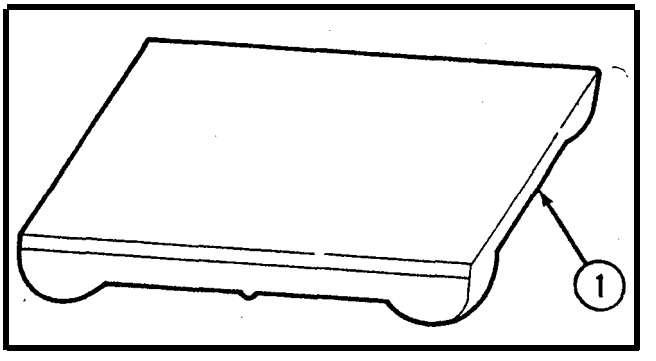
HEIGHT GAGE



A height gage is used in the layout of jigs and fixtures. On a bench, it is used to check the location of holes and surfaces. It accurately measures and marks off vertical distances from a plane surface.

The vernier height gage is a caliper with a special base (1) to adapt it for use on a surface plate. Height gages are available in several sizes. Most common are the 10, 18, and 24-inch gages in English measure. The most common metric gages are the 25 and 46-centimeter sizes. Height gages are classified by the dimension they will measure above the surface plate. Like the vernier caliper (see chapter 6, Reading a Vernier Caliper), height gages are graduated in divisions of 0.025 inch. Its vernier scale is divided into 25 units for reading thousandths of an inch.

SURFACE PLATE



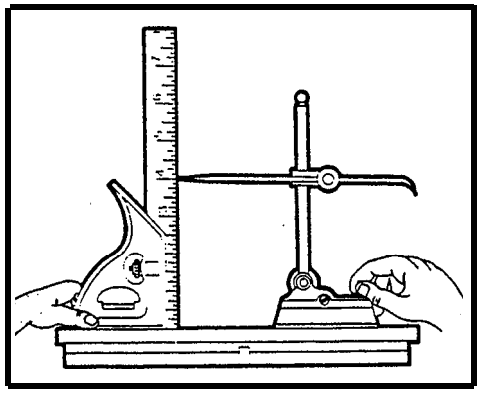
A surface plate provides a true, smooth, planesurface. It is often used as a level base for surface and height gages from which to make accurate measurements.

Surface plates are usually made of close grained cast iron (1), are rectangular in shape, and come in a variety of sizes.

USING THE SURFACE, DEPTH, AND HEIGHT GAGES

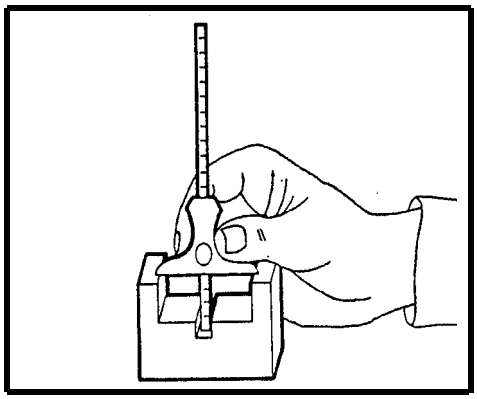
Below are examples of how each of the gages mentioned in this chapter can be used.

USING A SURFACE GAGE



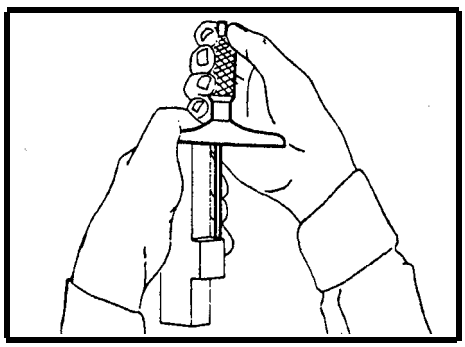
Setting gage for transfer of 4-inch vertical measurement.

USING A RULE DEPTH GAGE



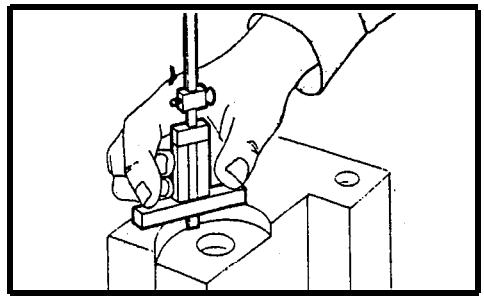
Measuring the distance from a surface to a recessed point.

USING A MICROMETER DEPTH GAGE



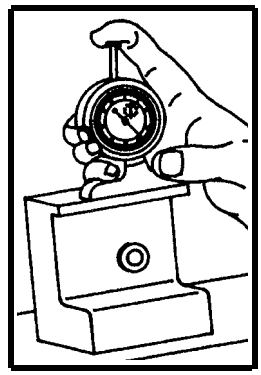
Measuring projection depth with micrometer precision.

USING A VERNIER DEPTH GAGE



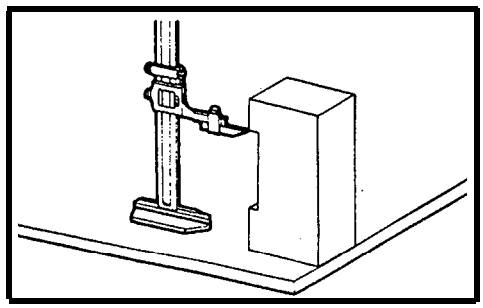
Measuring hole depth of die from a given surface.

USING A DIAL DEPTH GAGE



Measuring depths of holes, recesses, slots, scratches, and paint thicknesses.

USING A HEIGHT GAGE



Measuring vertical distance from a plane surface.

CARE OF SURFACE, HEIGHT, AND DEPTH GAGES

1. Coat all metal parts of gages with a light coat of oil to prevent rust.
2. Carefully store gages when not in use. Use separate containers if provided by manufacturer.
3. Keep graduations and markings clean and legible.
4. Do not drop any gage. Small nicks and scratches can cause inaccurate measurements.
5. Protect all pointed gage parts from damage.